

# UC Davis

## UC Davis Previously Published Works

**Title**

Family planning, population growth, and the environment.

**Permalink**

<https://escholarship.org/uc/item/9s70g6km>

**Journal**

Contraception, 101(3)

**ISSN**

0010-7824

**Authors**

Jensen, Jeffrey T  
Creinin, Mitchell D

**Publication Date**

2020-03-01

**DOI**

10.1016/j.contraception.2020.02.003

Peer reviewed

Editorial

**Family planning, population growth, and the environment**

Jeffrey T. Jensen, MD, MPH<sup>a</sup>

Mitchell D. Creinin, MD<sup>b</sup>

<sup>a</sup> Oregon Health & Science University, Portland, OR, USA

<sup>b</sup> University of California, Davis; Sacramento, CA, USA

Corresponding author: Mitchell D. Creinin, MD

University of California, Davis

Department of Obstetrics and Gynecology

4860 Y Street, Suite 2500, Sacramento, CA 95817

916-734-6670

mdcreinin@ucdavis.edu

Word Count: 1226

19 As we enter a new decade and the 50<sup>th</sup> anniversary year for *Contraception*,  
20 earth's human population is nearly 7.8 billion. When Dan Mishell started our  
21 journal in 1970, earth's population had not yet reached 4 billion. By this  
22 metric, one might conclude that our efforts at family planning have failed.  
23 More optimistically, we look at the considerable diversity of modern  
24 contraceptive methods, and the impact they have made in improving  
25 women's lives and at reducing the risk of unintended pregnancy.

26  
27 With better policies, increased financial resources and luck, our collective  
28 work in family planning will slow the rate of population growth over the next  
29 80 years; population will peak at or below 10.9 billion around 2100 before  
30 gradually stabilizing or declining in the next millennium (Figure 1) [1].  
31 However, attaining this goal will require us to achieve rapidly a global total  
32 fertility rate (TFR) of about 2.1, a feat yet accomplished. We remain  
33 optimistic in pursuit of this objective; the consequences of failure are  
34 unacceptable. Family planning is the most humane and viable strategy for  
35 human survival.

36  
37 Most people have little understanding of the dynamics of human population  
38 growth. About 2 million years ago, hominoids began their ascent on the  
39 African continent and spread throughout the world [2]. By 40,000 years ago,  
40 the era of speciation of humans had ended, with only *Homo sapiens*  
41 remaining [3]. Throughout most of human history, world population  
42 remained stable and in balance with resource consumption. Human  
43 population did not reach 1 billion until about 1827 [4]. Emerging  
44 technologies allowing exploitation of new energy resources, advances in  
45 disease prevention, and improved agricultural techniques have since  
46 resulted in exponential growth; we reached the second billion by 1920, the  
47 third by 1957, the fourth by 1974, the fifth by 1987, the sixth by 1999, and 7  
48 billion people in 2011 [4-8]. Between the third and fourth billion, sometime  
49 around 1970, the resources used daily surpassed what the Earth can

maintain, meaning that Earth cannot generate resources fast enough to support our growing population [9]. Already, nations compete vigorously for the finite resources of Earth, with ecosystem transformation, extinctions, and pollution contributing to rising nationalism, war, famine, and migration of displaced people symptoms of massive inequality of wealth and resource distribution [10].

Fifty years ago, Professor Paul Ehrlich of Stanford University alerted the world to the hazards of unchecked population growth through publication of *The Population Bomb* [11]. Widely criticized as Malthusian sensationalism, his predications of exponential population growth leading to food insecurity and environmental degradation generally reflect the dilemma of our modern world [12]. In a 2014 commentary, Ehrlich urged greater activism: “All scientists should be allocating a significant amount of effort to promoting understanding and action to deal with the major drivers of environmental destruction: population growth, overconsumption by the rich, and socio-economic inequity” [13]. As family planning specialists, we should devote part of our effort to educating policy leaders and the public about the importance of our work from an environmental standpoint.

Paul Erhlich and John Holdren provided a useful formula to relate environmental impact to population and consumption in a 1971 paper published in *Science* [14]:

$$I = P \cdot A \cdot T$$

**where:  $I$  = environmental impact**

**$P$  = population size**

**$A$  = affluence (a measure of consumption)**

**$T$  = technology (a measure of energy use to support the affluence)**

This formula allows us to compare the relative environmental impact of different countries. Rich nations like the United States, with high affluence,

wasteful energy policies and a relatively large population size have the greatest overall global environmental impact. In rich nations with stable populations, a dual strategy of embracing policies that reduce both the **T** (such as substituting renewable energy for coal) and **A** (changing the ethos to “enough” rather than “more”) diminish overall impact. While poor nations such as India with low per capita affluence and energy use have a comparatively lower global impact, we cannot neglect the contribution of a large and growing population. Understandably, citizens of poor nations aspire to gain the wealth common in rich nations, but as income rises so does energy use and consumption. Even small gains in **A** and **T** in nations with large and growing populations contribute greatly to global **I**. For example, China has become the world's leading consumer of natural resources and the greatest emitter of the greenhouse gas CO<sub>2</sub>, and estimates suggest that total carbon emissions from developing nations will exceed those of more developed economies by 2030 [15]. Moreover, migrants to the United States and Europe from poor regions understandably seek to consume at North American and European levels, increasing global **I** even faster.

The only variable that will reduce **I** under all scenarios is reduction in **P**. We cannot overemphasize the importance of voluntary contraception and global family planning policies as the most humane and practical approach to a just and peaceful future for our grandchildren. The Centers for Disease Control and Prevention recognized the importance of these issues, citing family planning as one of the 10 great public health achievements of the 20<sup>th</sup> century [16].

As we continue further into the 21<sup>st</sup> century, how will we respond to the possible addition of 4 billion more inhabitants by the end of the century? As biologists, we see a world of finite resources under significant stress at our current population under siege by a global economic policy that assumes

112 human ingenuity will continue to provide for any number of humans. This  
113 ingenuity hypothesis faces an enormous test in the coming decades. Will we  
114 see global cooperation or conflict as nations vigorously compete for earth's  
115 limited resources? The wild card effects of global warming and degradation  
116 of ecosystem services contribute further to our concerns about  
117 overpopulation [17,18].

118

119 The history of our era will be the story of how the minority of earth's  
120 inhabitants living in rich nations will either share or deny earth's finite  
121 resources to the majority of inhabitants living in poor nations. The  
122 unrelenting pressure of future population growth only intensifies every  
123 environmental and social challenge. Unfortunately, the politics of population  
124 growth and income inequality often interfere with discussion of population  
125 policies. For this reason, many environmental and social justice advocates  
126 hesitate to prioritize family planning as a policy objective. This thinking fails  
127 to consider our fragile and interconnected earth. Both rich and poor nations  
128 have a responsibility to limit family size and future population growth. The  
129 world cannot sustain unchecked consumption in rich nations, nor high  
130 fertility in poor nations. While social justice efforts to reduce inequality must  
131 continue, it is naïve to consider that increasing population does not  
132 exacerbate the problem of wealth disparity. Given that current levels of  
133 migration have led to the rise of right-wing anti-immigrant governments in  
134 many nations, what can we expect as environmental disasters and conflict  
135 increase the flow?

136

137 Family planning is the most humane vehicle for achieving sustainable social  
138 and environmental justice. *Contraception* has been an important means for  
139 scientists and scholars to share advances in family planning research and  
140 advocacy over the past fifty years, with the last ten years notable for being  
141 the official journal of the Society of Family Planning. As we move into the  
142 next fifty years of family planning research and advocacy, let us proudly

143 promote our work, and educate policy makers and the public about the link  
144 between human population and complex environmental and social problems.

145

146 Acknowledgements: This commentary is adapted from Jensen JT, Creinin MD.  
147 Contraception, Population, and the Environment (Ch. 1). In: Jensen JT, Creinin  
148 MD, editors. Speroff and Darney's Clinical Guide to Contraception, 6th ed.,  
149 Wolters Kluwer, 2019, p.1 -29.

150

151 Funding: This research did not receive any specific grant from funding  
152 agencies in the public, commercial, or not-for-profit sectors.

## References

1. United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019, Volume I: Comprehensive Tables. Available from: [https://population.un.org/wpp/Publications/Files/WPP2019\\_Volume-I\\_Comprehensive-Tables.pdf](https://population.un.org/wpp/Publications/Files/WPP2019_Volume-I_Comprehensive-Tables.pdf).
2. Stringer C. The origin and evolution of Homo sapiens. *Philos Trans R Soc Lond B Biol Sci.* 2016;371(1698).
3. Higham T, Douka K, Wood R, Ramsey CB, Brock F, Basell L, et al. The timing and spatiotemporal patterning of Neanderthal disappearance. *Nature.* 2014;512(7514):306-9.
4. Durand JD. Historical Estimates of World Population: An Evaluation. *Population and Development Review.* 1977;3(3):253-96.
5. Leshner RL, Howick GJ. Assessing Technology Transfer: Scientific and Technical Information Division, Office of Technology Utilization, National Aeronautics and Space Administration; 1966. 121 p.
6. Hoggart L, Newton VL. Young women's experiences of side-effects from contraceptive implants: a challenge to bodily control. *Reproductive health matters.* 2013;21(41):196-204.
7. Speidel JJ, Weiss DC, Ethelston SA, Gilbert SM. Population policies, programmes and the environment. *Philos Trans R Soc Lond B Biol Sci.* 2009;364(1532):3049-65.
8. Crist E, Mora C, Engelman R. The interaction of human population, food production, and biodiversity protection. *Science.* 2017;356(6335):260-4.
9. WWF, editor. Living Planet Report 2014; species and spaces, people and places: World Wildlife Fund, Gland, Switzerland; 2014.
10. Ehrlich PR, Ehrlich AH. Future collapse: how optimistic should we be? *Proc Biol Sci.* 2013;280(1767):20131373.
11. Ehrlich PR. The Population Bomb. New York: Ballantine Books; 1968.
12. Ehrlich PR, Ehrlich AH. Can a collapse of global civilization be avoided? *Proc Biol Sci.* 2013;280(1754):20122845.



184 13. Beattie AJ, Ehrlich PR. Public outreach: Industries depend on  
185 biodiversity too. *Nature*. 2014;509(7502):563.

186 14. Ehrlich PR, Holdren JP. Impact of Population Growth. *Science*.  
187 1971;171(3977):1212-7.

188 15. Wheeler D, Ummel K. Another Inconvenient Truth: A Carbon-Intensive  
189 South Faces Environmental Disaster, No Matter What the North Does2007;  
190 (Working Paper 134). Available from:  
191 [https://www.cgdev.org/publication/another-inconvenient-truth-carbon-](https://www.cgdev.org/publication/another-inconvenient-truth-carbon-intensive-south-faces-environmental-disaster-no-matter)  
192 [intensive-south-faces-environmental-disaster-no-matter](https://www.cgdev.org/publication/another-inconvenient-truth-carbon-intensive-south-faces-environmental-disaster-no-matter).

193 16. From the Centers for Disease Control and Prevention. Achievements in  
194 public health, 1900-1999: family planning. *JAMA*. 2000;283(3):326-7, 31.

195 17. Millenium ecosystem assessment, 2005. *Ecosystems and Human Well-*  
196 *being: Synthesis*. Washington, DC: Island Press; 2005.

197 18. Barnosky AD, Brown JH, Daily GC, Dirzo R, Ehrlich AH, Ehrlich PR, et al.  
198 Introducing the Scientific Consensus on Maintaining Humanity's Life Support  
199 Systems in the 21st Century: Information for Policy Makers. *The*  
200 *Anthropocene Review*. 2014;1(1):78-109.

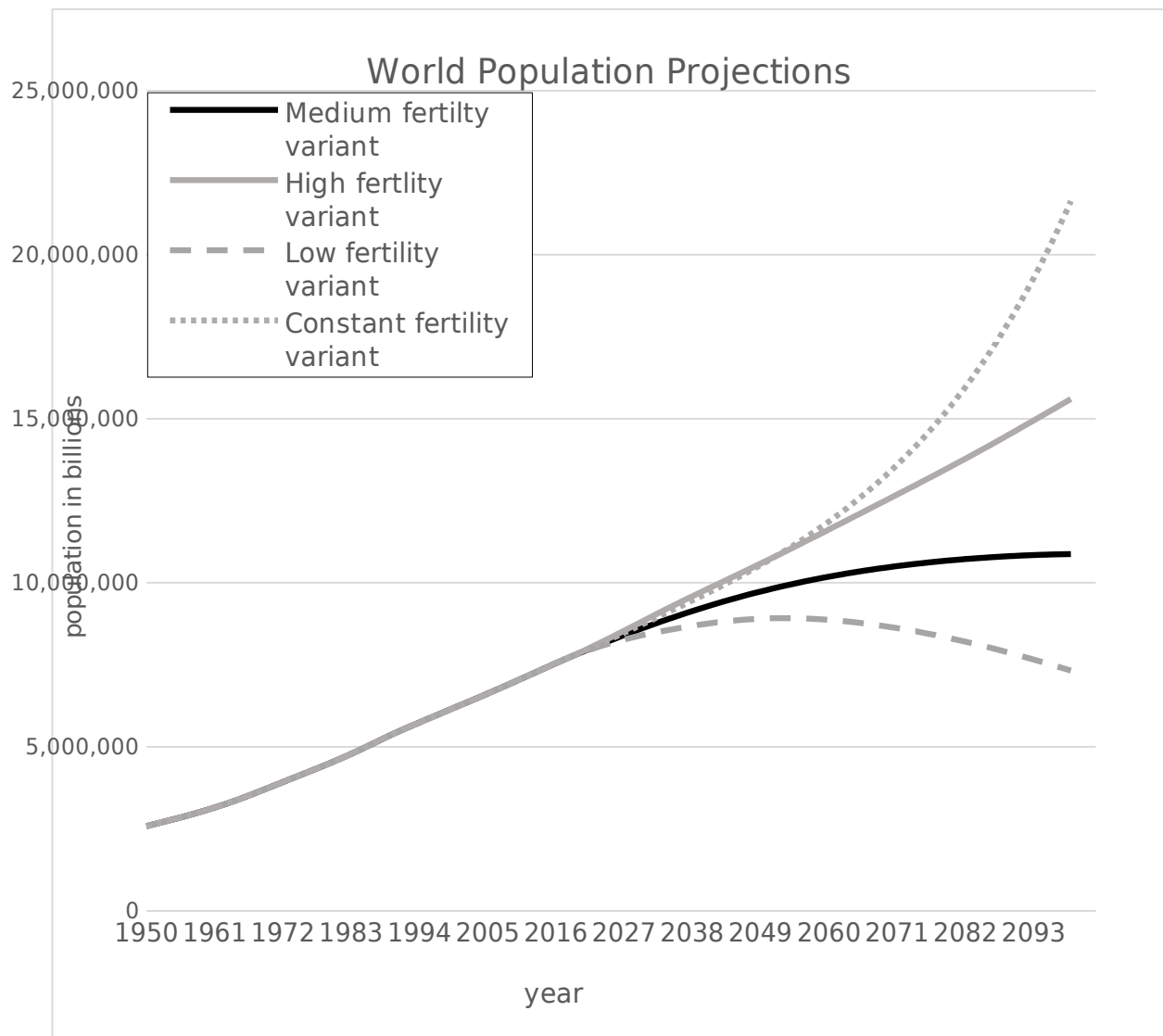


Fig 1. World population 1950-2019 with projections to 2100 according to various total fertility rate (TFR) scenarios. In the medium variant projection, global fertility falls from just under 2.5 births per woman in 2019 to around 2.2 in 2050 and further to 1.9 in 2100. Under the high variant, fertility remains 0.5 births above the medium variant fertility over the entire projection period except for the initial years. Under the low variant, fertility decreases to 0.5 births below the medium variant fertility estimate over most of the projection period. The constant-fertility variant assumes fertility remains constant in all countries at the level estimated for 2015-2020. Mortality and migration estimates are the same in all variants

Source: United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019, Online Edition.

